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CENTRAL INTELLIGENCE AGENCY

INFORMATION FROM
FOREIGN DOCUMENTS OR RADIO BROADCASTS

REPORT

CD NO. --

COUNTRY	Yugoslavia
SUBJECT	Scientific - Miscellaneous, institute Biographic
HOW PUBLISHED	Newspapers, periodical, books
WHERE PUBLISHED	Yugoslavia
DATE PUBLISHED	1950 - 1953
LANGUAGE	Croatian, Serbian

DATE OF INFORMATION 1950 - 1953

DATE DIST. 14 Sep 1953

NO. OF PAGES 8

SUPPLEMENT TO REPORT NO.

THIS IS UNEVALUATED INFORMATION

SOURCE Newspapers, periodical, and books as indicated.

INFORMATION ON DIRECTOR AND MANAGER OF YUGOSLAV "BORIS KIDRIC" INSTITUTE

The 19 April 1953 issue of the Yugoslav daily newspaper Borba carried a detailed article on the "Boris Kidric" Institute for Research in Mater (Institut za ispitivanje materije "Boris Kidric"), formerly the Vinca Institute for Research in Matter. This article was translated in full in the Joint Translation Summary of the Yugoslav Press, No 915, 21 April 1953.

The article mentioned that Stevan Dedijer is director of the institute and Pavle Savic, manager. The following report is offered to give some information regarding the scientific work and thinking of these two men.

In searching for information on Stevan Dedijer, who is the brother of Vladimir Dedijer, editor of Borba and author of the recently published biography of Tito, it was found that Stevan Dedijer had written an article for Ekonomska politika (Economic Policy), a weekly newspaper. This article is given in full below to give some indication of his thinking on atomic energy. Recent Yugoslav bibliographies and publications have yielded no other information regarding the writings of Stevan Dedijer.

Pavle Savic, on the contrary, has long been a scientist of note in Yugoslavia. To give some indication of the position he holds in the Yugoslav scientific world, the second part of the following report goes into some detail about the memberships he holds, the reports he has analyzed, and works he has published in recent years.

Numbers in parentheses refer to appended sources.

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STEVAN DEDIJER

[The following is the full text of Stevan Dedijer's article, "The Needs and Possibilities for International Cooperation and Exchange of Information on Atomic Energy."]

The problem of international cooperation and exchange of information on atomic energy is of very great importance to all countries, especially those which are developing industrially but are still in the process of developing basic scientific, engineering, and specialized personnel, and are more or less in the elementary stages of laboratory experimentation and beginning studies in the atomic field.

To understand the form such cooperation will take and specific details regarding it, to foresee how this cooperation will develop and be proportioned, and to determine how much and in what ways Yugoslavia will participate in such cooperation are not theoretical problems; they are pressing practical problems for the "Boris Kidric" Institute in Vinca, which is engaged in beginning studies on atomic energy and the development of nuclear physics.

In the last few years, it has become clear that energy liberated by splitting the nuclei of uranium and plutonium can be utilized for peaceful purposes. It has become clear to management circles in many countries that backwardness in the atomic energy field may represent a serious defeat in the struggle for economic and political independence. Consequently, some European countries are energetically developing research centers in nuclear science and atomic energy. France has recently fulfilled its five-year plan in the field of atomic energy, and has constructed a large research center in Saclay. Italy is speeding up work in this field.

All European countries are investigating how and where they can apply atomic energy in their economy and what will be the results of developing atomic energy. Italy is developing research in this area because of limited power resources; Norway is studying the possibilities of using atomic power for maritime purposes.

Yugoslavia is asking itself what atomic energy can mean to its economy, to what degree it can bend its efforts in this field in the present state of its development, and in what direction it should bend its efforts.

The advantages of developing atomic energy lie with those countries whose industry -- especially heavy industry -- is well developed. Scientists and nuclear engineers find that for a country [illegible] developed scientific research, a slightly developed industry, and sufficiently varied raw materials for general use and for atomic energy in particular, international cooperation and utilization of knowledge gained from the experience and the economic possibilities of the use of atomic energy in other countries are among the main prerequisites to keep from lagging behind in atomic energy developments.

International cooperation and exchange of ideas in this field are connected mainly with the construction of nuclear reactors or uranium furnaces, basic installations for liberating large amounts of energy from the nuclei of atoms, and with trade in raw materials necessary for the construction of reactors. It is estimated that there are about 30 reactors throughout the world, and that about 10 more are under construction. Great Britain has five, ranging in power from 100 kilowatts to over 100,000 kilowatts; France has a 5-kilowatt reactor and a 1,000-kilowatt reactor; Norway has a reactor of over 300 kilowatts; and Sweden, Italy, Germany, and Switzerland are constructing reactors.

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A brief description of a very elementary type of reactor, which is no longer projected for construction in Europe, is as follows: The basic and main part of the Norwegian reactor, which serves as an example, is a kettle 2 x 2 meters in size, made of aluminum 2 millimeters thick. In it are hung about 70 bars of uranium 2 meters long, or about 2,200 kilograms of uranium. The kettle is filled with about 7 tons of heavy water. Under well controlled conditions, 300 kilowatts of power are liberated from the nuclei of uranium atoms by heating the kettle to a desired temperature, excess heat being drawn off by the circulation of heavy water. All reactors are more or less similar to the one described above. If graphite is used instead of heavy water for drawing off excess heat, much larger quantities of uranium are needed to obtain the same amount of power.

What purposes do reactors serve? All reactors in Europe are used for experimental purposes. They aid first of all in studying and solving problems connected with the construction of higher-powered reactors, to be used as a source of power for economic purposes, and they also aid in studying problems connected with nuclear physics and the production of important radioactive substances used in scientific and technical research.

Considering the tremendous cost of even the most elementary type of reactor like the one in Norway, one can estimate the importance attached by even small countries to research in atomic power.

The 100,000-kilowatt reactors, which Europe does not have and will not have for some years, are used in the production of plutonium, an explosive for one type of atom bomb.

The construction of a reactor requires the following:

1. Personnel familiar with nuclear physics; electronics engineers; technological engineers; and nuclear engineers who know how to apply their knowledge of nuclear physics, thermodynamics, metallurgy, and machine and installation construction in the construction of a reactor.

2. Uranium, graphite, heavy water, beryllium, zirconium, etc.

3. A well developed technological and metallurgical industry with sufficient power resources, and high quality materials employed in reactor construction.

4. Enormous quantities of power, not only for the production of material for the reactor (uranium, heavy water, graphite, etc.) but also for its operation.

5. Few countries can be independent as regards the conditions outlined above. For a small country or an insufficiently developed country to become independent in these respects represents Utopian megalomania. Consequently, the necessity for cooperation and exchange of information in the atomic energy field follows.

Behind the cloak of mystery, the air of conspiracy, and the secrecy surrounding work in connection with the construction of reactors, a group of countries is developing cooperation and exchange of ideas in this field and an exchange of raw materials for production of atomic energy. At present, a series of understandings and two-way international agreements on cooperation have been reached. The prime example is the Netherlands-Norway agreement on the construction of a reactor to be shared jointly, for which the Netherlands is contributing uranium and Norway heavy water. India has concluded an agreement with France on the construction of a reactor for both countries, etc.

Several cooperative ventures in the development of exploitation of raw material deposits are under way. France is cooperating with Brizil and India, while Australia is exploiting raw material deposits on the basis of an agreement with an American firm, etc.

Finished materials, equipment, and experiences are being exchanged. Norway supplies France, Great Britain, Sweden, and Switzerland with heavy water and receives in exchange uranium, graphite, instruments, blueprints, etc. Norway will probably expand its production of heavy water. France sells graphite to any buyer. Uranium ore and processed uranium ore are being exchanged in a limited way, for much secrecy and an air of conspiracy still surround uranium. It is slowly becoming a raw material available in international trade like copper, lead, and tin.

The Swiss have shown the most confidence in international cooperation in the atomic energy field. They have not been able to find any uranium in their country and they do not yet produce heavy water or graphite, but their science and engineering are well developed. Some of their firms have been studying the construction of reactors for several years. At the same time, technology and knowledge of metallurgy, which will be very useful in international cooperation, are developing in Switzerland.

Factors which conduce toward the continued development of cooperation are the following:

1. Many countries are developing technological or raw materials branches in accordance with their economic structure, which make possible exchange with countries which have other specialties.

2. In Europe, the idea is becoming prevalent that it is necessary to attempt joint efforts in the atomic energy field. In professional literature, the idea seems to be growing that countries, namely France, Switzerland, and Norway, should build reactors jointly, just as the European nuclear center in Geneva is being built jointly.

3. As knowledge and experience in nuclear physics and nuclear engineering develops in various countries, the monopoly of any one country of this knowledge and experience decreases, while international exchange of information and experience increases. For instance, European laboratories are now publishing results of work which once were secret and were known only to scientists and engineers in the US. Consequently, the US and Great Britain are publishing more and more results of their work; this publicity is necessary in the first phase of development on reactors.

4. Another factor leading to the development of international cooperation is the secrecy still surrounding the production of atomic weapons, which are under construction in only a few countries. The atmosphere of cooperation and the exchange of information, both scientific and technological, is much more propitious in continental Europe where such weapons are not being produced. There is no doubt that the possibilities for such cooperation and exchange will increase still more as small, medium-sized, and undeveloped countries increase their knowledge of atomic energy and nuclear science. Consequently, it is absolutely necessary for small and undeveloped countries constantly to review their policy regarding secrecy in the fields of atomic energy and nuclear science. In some countries there is scarcely any secrecy, not even in regard to deposits and reserves of uranium ore.

Yugoslavia's place in the atomic energy field corresponds to its current general development in science, industry, and technology. It is in the first phase of setting up a scientific base for atomic energy, the phase of studies and initial laboratory experiments. The "Boris Kidric" Institute in Vinca has established very good relations with all European

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countries, and the institute's associates have found continental European centers where reactors are under construction very hospitable. This cooperation is a valuable experience in this first phase, when Yugoslavia is determining what it can do, what it needs, and how it should work within its capabilities in the coming years in taking its first steps in the atomic energy field.(1)

PAVLE SAVIC

Positions Held

Pavle Savic, a professor in the Faculty of Natural Science and Mathematics at Belgrade University, is a member of the Plenum of the Presidency of the Serbian Academy of Science, is a member of the Institute Commission of the academy, and has been a member of the Serbian Academy of Science since 18 April 1948. He is a regular member of the academy's Division of Natural Science and Mathematics.

He is a member of the Scientific Council of the Institute of Physics.

Memberships

Pavle Savic is a member of the Administrative Council of the Society of Mathematicians and Physicists of Serbia, which was established in 1948. The society publishes Vesnik drustva matematicara i fizicara NR Srbije (Courier of the Society of Mathematicians and Physicists of the People's Republic of Serbia), a quarterly.

Savic is president of the Association of Societies of Mathematicians and Physicists of Yugoslavia, which coordinates the work of the republic Societies of Mathematicians and Physicists.

Editor

Pavle Savic is a member of the editorial board of the following publications: Glas - Odeljenja drustvenih nauka SAN (Voice of the Division of Social Sciences of the Serbian Academy of Science), which is issued periodically.

Spomenik - Odeljenja drustvenih nauka SAN (Memorial of the Division of Social Sciences of the Serbian Academy of Science), which is issued periodically.

Srpski ethnografski zbornik (The Serbian Ethnographic Journal), published periodically by the Serbian Academy of Science.

Zbornik za jezik i knjizevnost (Journal of Language and Literature), published periodically by the Serbian Academy of Science.

Glas - Odeljenja literature i jezika SAN (Voice of the Division of Literature and Languages of the Serbian Academy of Science), published periodically by the Serbian Academy of Science.

Glas - Odeljenja prirodno-matematickih nauka SAN (Voice of the Division of Natural Science and Mathematics of the Serbian Academy of Science), which is issued periodically.

Nauka i priroda (Science and Nature), the organ of the natural science societies of Serbia, which is published monthly.

Vesnik drustva mathematicara i fizicara NR Srbije (Courier of the Society of Mathematicians and Physicists of the People's Republic of Serbia), which is issued periodically by the society.

Glas - Odeljenja tehnickih nauka SAN (Voice of the Division of Technical Sciences of the Serbian Academy of Science), which is issued periodically.

Glas - Odeljenja medicinskih nauka SAN (Voice of the Division of Medical Sciences of the Serbian Academy of Science), which is published periodically.(2)

Analyst

The Second Assembly of the Division of Natural Science and Mathematics, held 19 June 1948, assigned for analysis to Pavle Savic: "O sintezi pencilina i njegovih protipova" (On the Synthesis of Penicillin and Its Prototypes), by Djordje K. Stefanovic and Ksenije D. Sirotanovic; and "Materija i sila" (Matter and Power), by Dr Sava Dimitrijevic.

The Fourth Assembly of the Division of Natural Science and Mathematics, held 5 October 1948, assigned for analysis to Pavle Savic: "Fizicke konstante hemiskih elemenata kao funkcije rednog broja i strukture atoma" (Physical Constants of Chemical Elements as Functions of the Regular Number and Structure of Atoms), by Egzakustodijan Dobrocvetov.

The Fifth Assembly of the Division of Natural Science and Mathematics, held 4 November 1948, assigned for analysis to Pavle Savic "Pritisak zasicene pare" (The Pressure of Condensed Steam), by Dragoljub Milosavljevic.(3)

Works

Between 1949 and August 1952, the following works of Pavle Savic were published:

"O novim mogucnostima dobijanja niskih temperatura" (On New Possibilities for Obtaining Low Temperatures), an article which was included in Glas Srpske akademije nauka, CXCII, Odeljenje prirodno-matematickih nauka (Voice of the Serbian Academy of Science, Vol 192, Division of Natural Science and Mathematics); edited by Vojislav V. Miskovic and Ivan Djaja; published by "Naucna knjiga," Belgrade, 1949.(4)

A letter addressed to Monsieur Joliot-Curie entitled, "In the Struggle for Peace, in the Struggle for Life, the Yugoslav Peoples are Joining Their Voices to the Voices of Millions of People in the Whole World, to the Invincible Triumphant Army of Freedom, Equality and Progress of Mankind - To Mr. Frederic Joliot-Curie, President of the Bureau of the World Congress of the Partizans [sic];" included in the book entitled For the Defense of Peace; published by "Jugoestampa," Belgrade, 1950.

"On the New Possibilities of Obtaining Low Temperatures," published in English in Bulletin de l'Academie Serbe des Sciences, Classe des sciences mathematiques et naturelles (Bulletin of the Serbian Academy of Science, Division of Natural Science and Mathematics); issued by "Naucna knjiga," Belgrade, 1950.(5)

"O strukturi materije" (On the Structure of Matter), a 19-page lecture given by Pavle Savic at Kolarceve People's University; published by Stamparija "Rad," Belgrade, 1951.

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"O strukturi materije" (On the Structure of Matter), a 15-page lecture given by Pavle Savic at Kolarcevo People's University; published by Stamparija "Rad," Belgrade, 1951.(6)

"O nekim problemima na kojima sam radio" (On Some Problems I Have Worked On), written for the Serbian Chemical Society; published by "Naucna knjiga," Belgrade, 1951; contains a bibliography and resume of the article in English. This article was first published in Glasnik hemiskog drustva (Courier of the Chemical Society).(7)

"Primena paravodonika za postizanje najnizih temperatura" (Use of Parahydrogen to Obtain Lowest Temperatures), an article which was published in the book entitled Prvi kongres matematicara i fizicara FNRJ, II, Naucna saopstenja i obavestenja (First Congress of the Mathematicians and Physicists of the Federal People's Republic of Yugoslavia, Vol 2, Scientific Reports and Information); edited by Tatomir Andelic; published by "Naucna knjiga," Belgrade, for the Association of Societies of Mathematicians and Physicists of the Federal People's Republic of Yugoslavia. A resume in English of the article was included.

"Upotreba fotocelije za dobijanje univerzalne promocne elektrode kod potenciometarskih titracija" (The Use of the Photocell for Obtaining a Universal Auxiliary Electrode in Potentiometric Titrations), by Pavle Savic and Ivan Gal; published by "Naucna knjiga," Belgrade, 1951, with a resume in English. This article was first published in Glas - Odeljenje prirodno-matematickih nauka SAN (Voice of the Division of Natural Science and Mathematics of the Serbian Academy of Science).

"Fluorimetrisko odredjivanje urana" (Fluorometric Determination of Uranium), by Pavle Savic and Ivan Draganic; published by "Naucna knjiga," Belgrade, 1951, with a resume in English. This was first published in Glas-Odeljenje prirodno-matematickih nauka SAN (Voice of the Division of Natural Science and Mathematics of the Serbian Academy of Science).(8)

"Primena paravodonika za postizanje najnizih temperatura" (Use of Parahydrogen to Obtain Lowest Temperatures); first published in Prvi kongress matematicara i fizicara FNRJ, mentioned above; later published separately by "Naucna knjiga," Belgrade, 1951.(9)

Recueil des travaux de l'Institut de recherches sur la structure de la matiere, Vol 1 (Collection of Works of the Institute for Research in Matter); edited by Pavle Savic, Dr Robert J. Walen, and Dusan Mitrovic; published by "Naucna knjiga", Belgrade, 1952.(10)

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2. Belgrade, Materijal o naucnim ustanovima i casopisima u FNRJ (Material on Scientific Establishments and Periodicals in Yugoslavia), Mar 50 /book/

3. Belgrade, Godinsjak Srpske akademije nauka (Yearbook of the Serbian Academy of Science), Vol 55, 1948

4. Belgrade, Bibliografija Jugoslavije (Bibliography of Yugoslavia), Jan - Mar 50 /monthly periodical/

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7. Ibid., Sep 51
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